



September 12, 2011

Mr. Peter Magolske
Air/RCRA Compliance Unit
U. S. Environmental Protection Agency Region 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

Mr. Brian Monson
Idaho Department of Environmental Quality
1410 N. Hilton Street
Boise, ID 83706

Re: ERI and TDIP – Revised Boring Locations and Drilling Approach
Administrative Order on Consent for Nu-West CPO Facility
Docket No. RCRA-10-2009-0186

Dear Mr. Magolske:

This letter is prepared in response to EPA's August 29, 2011 correspondence which (1) approved the advancement of five boreholes along Electrical Resistivity Imaging (ERI) and Time Induced Polarization (TDIP) Transect 3 as identified in the ERI and TDIP Data Summary (August 19, 2011); and (2) specified that four additional boreholes be advanced to better understand and interpret the ERI and TDIP survey results.

WSP Environment & Energy (WSP) and Nu-West have reviewed the locations of additional borings identified by EPA. Based on this evaluation, we seek a modification to the number and location of additional boreholes identified by EPA. This letter presents:

- Rationale for borehole locations along Transect 3,
- Revised plan for completion of drilling activities of boreholes along Transect 3, based on information from borehole drilling progress along Transect 3 observed to date and geophysical logging results conducted to date on upgradient boreholes.

Due to the drilling progress that is currently underway, WSP and Nu-West seek EPA's response for the revised approach for boreholes as described in this letter by close of business on Tuesday, September 13, 2011. We are available to discuss at your convenience.

BOREHOLE LOCATIONS

The five approved boreholes are located at 140 meters, 310 meters, 800 meters, 1,300 meters, and 1,720 meters along Transect 3. Drilling at these five locations has since begun.

The four additional boreholes identified by EPA would be located at 490 meters, 720 meters, 1,020 meters, and 1,620 meters along Transect 3. Figure 1 shows the locations of the

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boreholes while Figures 2 and 3 show the borehole locations as projected on the ERI and chargeability profiles for Transect 3.

The factors evaluated for borehole locations along Transect 3 included:

- Targeted resistivity and chargeability anomalies
- Locations in relation to features of the Old Gypstack (F-GYP-0) and Tailings Pond No. 2
- Schedule for drilling, geophysical logging, and well installation.

The EPA identified boreholes at 490 meters and 720 meters both target low resistivity and low chargeability features within the upper portion of the saturated zone. The EPA identified boreholes at 490 meters and 720 meters are both located downgradient of Cell 2/3 of F-GYP-0. Rather than installing boreholes at 490 meters and 720 meters, Nu-West and WSP propose install one additional borehole located at 640 meters along Transect 3. A borehole at 640 meters meets EPA objectives that were set forth for the two boreholes at 490 meters and 720 meters as follows:

- The borehole at 640 meters is located within an area of low modelled resistivity and low chargeability, and would evaluate similar features as those at 490 meters and 720 meters.
- The borehole location at 640 meters would serve as a monitoring point downgradient of Cell 2/3 of F-GYP-0. Combined with the EPA approved borehole at 800 meters, two monitoring points will be located downgradient of Cell 2/3 of F-GYP-0.
- Replacing two boreholes with one borehole will provide additional surety for completion of well installation in this field season.

The additional borehole identified by EPA at 1,020 meters targets a low resistivity and chargeability feature and will be incorporated into the scope of work. The boring at 1,620 meters targets a zone of high chargeability and will be drilled to a depth of 40 meters, as specified by EPA.

The resulting 8 borehole locations would allow for two monitoring points downgradient of Tailings Pond No. 2; and Cell TP-3, Cell 2/3, and Cell No. 1 of F-GYP-0. Boreholes, including those that have been previously approved by EPA, have been labelled as "A-18" through "A-25", in increasing numerical order from south to north, as shown on Figure 1.¹ A summary of apparent and modelled resistivity and chargeability for each borehole is provided in Table 1.

REVISED DRILLING AND GEOPHYSICAL LOGGING APPROACH

Drilling and geophysical logging of the 8 boreholes, followed by well installation, are expected to be completed within the 2011 field season. We anticipate the end of the field season when drill rigs can be mobile at the site, and therefore, completion date for well installation, to be the beginning of November.²

¹ EPA-approved borehole locations have been re-numbered since the August 19 letter.

² Climate data from Western Region Climate Center (WRCC) measured from the Soda Springs Airport are provided. <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?id8535>
In October, average precipitation is 1.23 inches, snowfall is 0.9 inches, average snow depth is 0-inch (no accumulation), and average minimum and maximum temperatures in October are 59°F and 27°F,

Based on requirements stated in the Work Plan for Additional Requirements, drilling, geophysical logging (with data processing and EPA review), and well installation would have to be completed in the following sequence to meet the November deadline:

September 2011

1. Set surface casing into bedrock
 - a. Expected to be at 20 feet bgs, based on observations from A-18 and A-19.
2. Continuous core from surface casing depth to total depth.
 - a. Expected to be 1,370 feet, based on 7 boreholes from 20 to 200 feet bgs, and one borehole from 20 to 130 feet bgs (borehole at 1,620 meters).
3. Ream continuously cored hole to nominal 6-inch diameter.
 - a. Expected to be 1,370 feet, same as the cored footage.

October 2011

4. Perform geophysical logging on boreholes.
5. Process data and propose screened intervals for EPA review.

By Middle of November 2011

6. Install groundwater monitoring wells.

Coring 180 feet at borehole A-18 took a total of 5 days (as described further below). Based on this, the number of days required to core 7 boreholes from 20 to 200 feet, and 1 borehole from 20 to 130 feet is estimated to be 33 days. The duration for coring alone exceeds anticipated available days in this field season for drilling³, and does not include time required to set surface casing at each borehole location and time to ream the cored borehole to total depth.

In an effort to complete installation of 8 monitoring wells this field season, WSP and Nu-West evaluated foregoing coring for boreholes A-19 through A-25. The intent of coring of each borehole was stated in EPA's letter dated May 25, 2011:

The core allows us to confirm the stratigraphic sequence at each boring location. They will allow us to confirm in the intact core what we see with all the geophysical tools we have proposed. The core will provide the only means to recover loose material which will only appear on the Televierer Logs as voids.

Based on the Optical Televierer Image Plot for upgradient borehole A-14, the optical televierer effectively shows the stratigraphic sequence within the borehole with very good resolution to total depth. In comparison, cores from A-14 produced very poor recovery from 143 to 200 feet bgs. In fact, no recovery was noted between 161 to 180 feet bgs, and 188.5 to 190 feet bgs. Within these intervals, the televierer showed intact geologic sequence. At this location, the results of the televierer provided better resolution and geologic information for loose materials that were not recoverable during coring.

respectively. In November, the average snow depth increases to 1-inch, and increases successively through the winter months. The average minimum and maximum temperatures in November are 42°F and 19°F, respectively.

³ Starting from September 12, 2011, a total of 28 drilling days remain. Two rigs are currently in operation and are expected to work from September 12 through 15, and September 20 through 29.

As shown in historic well logs, “soft caving lava” is expected to be present in the boreholes in the vicinity of Transect 3. If these zones are encountered during drilling which does not allow for a stable and open borehole, a temporary 4-inch PVC casing will be installed within the borehole. Within a 4-inch temporary casing the suite of geophysical logging methods are limited to natural gamma radiation, sonic, gamma-gamma density, neutron porosity, fluid conductivity and fluid temperature, and flow meter. Based on the geophysical logging results at A-14, a reduced suite of geophysical logs in combination with drilling observations (e.g. rock cutting lithology, rate of advancement, depth of first strike of groundwater and approximate groundwater yield) will be capable of characterizing the nature of the basalt flow sequence including the lithologic structure and the zones of groundwater contribution to the borehole, and capable of providing information for proposing screened intervals in a borehole.

WSP and Nu-West seek EPA approval to forego coring at the certain ERI boreholes, such that drilling activities can be completed by September 29 as follows:

- From work completed to date (described in detail in the “Upgradient Geophysical Logging” section below), geophysical logging is effective for aquifer and bedrock characterization, providing information that would otherwise be provided by coring observations.
- The geophysical logging results would be coupled with drilling observations (e.g. rock cutting lithology, rate of advancement, depth of first strike of groundwater and groundwater yield), and is expected to provide technically sound data for screened interval determination.
- The time required to core through 8 boreholes exceeds the available drilling days that remain within this field season. Foregoing coring may be the way for all monitoring wells to be installed along Transect 3 within the field season of 2011.

Based on the duration required to core A-18, coring is expected to be achieved in 3 of 8 locations. Coring is anticipated at the following locations:

- A-18 (coring was completed September 11).
- A-23 (coring will occur from September 12 through 15, and 20).
- A-25 (coring will occur from September 21 through 24).

A detailed schedule is included as Figure 4. For the remaining locations, surface casing will be set into bedrock, followed by reaming to total depth.

Geophysical logging is anticipated to start following reaming and development of the ERI boreholes. Geophysical logging for each well is expected to take two days, such that geophysical logging of 8 wells is expected to take 16 days. Pending subcontractor availability, two logging teams will be mobilized such that geophysical logging can be completed in 8 days. Geophysical logging is expected to begin on September 30, and be completed by October 7. Upon completion of geophysical logging at initial locations, Nu-West will submit preliminary geophysical logging results to EPA within 7 days of completion, and final data with recommendations for screened interval within 14 days following completion of geophysical logging.

BOREHOLE DRILLING PROGRESS ALONG TRANSECT 3

Surface casing at A-18 and A-19, the two southernmost EPA approved borehole locations, were installed on September 1, 2011. At A-18, bedrock was encountered at 14 feet bgs, and surface casing was set at 15.8 feet bgs. At A-19, bedrock was encountered at 18 feet bgs, and surface casing was set at 20 feet bgs.

Coring at A-18 from 15.8 to 200 feet bgs took five days, from September 7 to September 11. Photos showing rock cores recovered from A-18 are provided in Enclosure A. The water table was encountered at 100 feet bgs. For comparison, coring through saturated basalt at A-14, an upgradient borehole, was completed at rates ranging from 25 to 36 feet per day.

During coring, water is circulated from surface to the coring bit at the end of the drill string in order to keep the coring bit cool and remove cuttings from the bit face. The circulated water is recovered at the surface and discharged to a holding tub for recirculation. In A-18 significant water loss (that is, water was not recovered at the surface) occurred, which coincided with sizeable fracture zones observed in the rock cores:

- 25' to 32' bgs: approximately 1,400 gallons of water lost.
- 48' to 48.5' bgs: approximately 1,400 gallons of water lost.
- 72'4" to 75' bgs: approximately 8,900 gallons of water lost.

Water for drilling is brought in from the CPO processing area. The time required for bringing in additional water is delaying drilling progress.

Instead of setting surface casing to a foot below competent bedrock (expected to be 20 feet bgs), WSP and Nu-West propose to set surface casing to 50 feet bgs or depth to water, whichever is encountered first based on the following reasons:

- Setting deeper surface casing will reduce the potential for loss of circulation delays associated with drilling through fractured bedrock in the vadose zone; which would ultimately increase our ability to complete drilling on-time.
- Well screens for along Transect 3 are not expected to be set between 20 and 50 feet bgs, as depth to water is rarely measured at depths above 50 feet bgs based on historic depth to water measurements at wells A-4 and A-7.
- Extending surface casing to 50 feet bgs provides better assurance that the borehole will remain open and stable, thus allowing for complete geophysical logging suite.

UPGRADIENT WELL GEOPHYSICAL LOGGING

Of the five upgradient boreholes drilled in August 2011, three were completed as open boreholes (i.e., A-14, A-15, and A-16) and geophysical logging of the boreholes was completed between September 8 through 10, 2011. A-14 and A-15 are two co-located boreholes drilled to 200 and 150 feet bgs, respectively. The features identified in the A-14 borehole are described below.

- 55 feet bgs: depth to bedrock
- 56.5 feet bgs: depth of surface casing

- 57 feet bgs: depth to water
- 55 to 143 feet bgs: basalt bedrock
- 143 to 200 feet bgs: sandstone/claystone

The basalt bedrock identified in A-14 extends and thickens to west under the Main Processing Area and the Old Gyp Stack (F-Gyp-0) to the ERI borehole locations, such that the characteristics of the basalt sequence observed at A-14 (e.g. typical basalt flow thickness, nature of flow tops and interiors, degree of fracturing) is expected to be analogous at the ERI boreholes. Based on this, a portion of the draft geophysical logging results from A-14 are discussed in this letter, and included as Enclosure B⁴. The complete draft and final geophysical logging results, along with proposed depth for screen intervals for the upgradient boreholes, will be submitted to EPA under separate cover.

Geophysical logging of A-14 was conducted from September 8 through 10, 2011. Geophysical logging consisted of the following methods⁵:

- Optical televiewer
- Borehole diameter using 3-arm caliper
- Natural gamma radiation
- Electric Log, including spontaneous potential (SP), single-point resistance (SPR), normal resistivity
- Full waveform sonic velocity
- Gamma-gamma density (also called compensated density)
- Neutron porosity (also called thermal neutron)
- Fluid conductivity and fluid temperature
- Flow meter

The draft Geophysical/Hydrophysical Summary Plot for A-14 (Enclosure B) includes the results for all geophysical logging except full waveform sonic velocity and flowmeter, as these two methods require some additional post-processing of data, and SP and SPR, which will be included in subsequent submittals but were not included in the enclosed plots generated in the field.

The borehole wall image derived from the optical televiewer is paired with the caliper log in the enclosed Optical Televiewer Image Plot. The high resolution of the optical televiewer image allows for a detailed assessment of the basalt and underlying sedimentary rocks. Within the basalt portion of the log [60.8 to 146.5 feet below top of casing (btoc)], the individual basalt flow sequence is evident with flow tops characterized by increased fracturing, discoloration, and larger and closer spaced vesicles. The dense flow interiors are largely unfractured with very few, small vesicles. These visually identified fractures associated with the flow tops coincide with increased borehole diameter (i.e., diameter greater than 6-inches) as measured by the 3-arm caliper. Within the underlying sedimentary sequence, the optical televiewer indicates the orientation and thickness of bedding and images bedding-plane parallel and vertical fractures.

⁴ Colog's geophysical logging was depth referenced to the top of the surface casing, which is 1.5 feet above ground surface at A-14. Therefore, the depths shown on Colog's vertical profiles differ from drilling observations by 1.5 feet. Depth will be reported as feet below ground surface, i.e., by subtracting 1.5-feet from the observed depths in Colog's profiles.

⁵ The electromagnetic induction tool was inadvertently not brought to the site for geophysical logging but will be included in geophysical logging of ERI boreholes.

In addition to the optical televiewer image, the Summary Plot also includes several other logs that measure formation properties.

- Natural gamma logs are sensitive to increasing clay content in the formation, and for basalt, natural gamma is useful for identifying clay interbeds within the sequence, if present. The natural gamma counts per second (cps) in the A-14 log are relatively low within the basalt but increase notably at the bottom of the borehole in the sedimentary rocks.
- Neutron logs are effectively a measure of water content of the formation, with increasing counts per second (cps) associated with a decrease in water content (increased bulk porosity). For basalt, the neutron logs are useful for identifying the increased porosity associated with saturated interflow zones or the presence of hydrous alteration minerals. In the A-14 neutron logs, there is a shift toward lower neutron cps at the water surface (54.3 feet btoc) and deflections toward lower neutron cps associated with the fractured basalt interflow zones (e.g. 72 to 73 feet btoc and 88 to 95 feet btoc). The neutron logs show little variation in the underlying sedimentary rocks.
- Gamma-gamma-density logs reflect the density of the formation, and for basalt are useful for identifying the variation between the dense flow interiors and lower density flow tops and interflow zones. In the A-14 density logs, numerous deflections occur between 60 and 104 feet btoc and correlate to basalt flow boundaries identified in the optical televiewer log. The underlying sandstone and claystone exhibit an overall lower and more variable density than the basalt and do not exhibit the prominent sharp density deflections associated with the basalt flow boundaries.
- Normal resistivity logs measure the formation resistivity using a downhole electrode array and are sensitive to changing resistivity due to changing lithology or formation water content and conductivity. In basalt, normal resistivity logs are useful in differentiating between the resistive flow interiors and the more conductive interflow zones with associated higher porosity and clay content. In the A-14 logs, the long normal resistivity log (64") correlates well with the other geophysical and televiewer logs, exhibiting increased resistivity in the basalt flow interiors and decreased resistivity in the flow boundaries. The underlying sandstone and claystone exhibit an overall lower and less variable resistivity than the basalt.
- The fluid temperature and conductivity logs measure changes in borehole fluid properties and are useful in identifying zones of ambient inflow and outflow to the borehole. The A-14 fluid temperature and conductivity logs indicate that the borehole fluid is changing between approximately 90 and 100 feet btoc and between 190 and 195 feet btoc. Ambient flowmeter logging at A-14 indicated a zone of inflow between 86 and 96 feet btoc with downward flow to 145 feet btoc and outflow between 145 and 151.5 feet btoc. During stressed flowmeter testing at A-14, groundwater was pumped at 26 gallons per minute (gpm) with one foot of drawdown, and the vast majority of flow was produced by zones within the basalt above 110 feet bgs. Less than 1 gpm was produced by the bottom of the borehole in the sedimentary rocks.

September 12, 2011

Based on A-14, information derived from geophysical logging can be successfully used to characterize the nature of the basalt flow sequence including the lithologic structure and the zones of groundwater contribution to the borehole.

In the event that an unstable borehole requires that temporary slotted casing be installed to maintain an open borehole, the geophysical logging suite would be reduced, but would still include natural gamma, neutron, gamma-gamma-density, electromagnetic induction (in lieu of e-log), sonic velocity, fluid temperature and conductivity, and flowmeter. As described above, the results of the limited suite of geophysical logging provide information that reflects findings provided in the full suite of geophysical logging, including televiwer and caliper log. The results at A-14 indicate that the limited geophysical methods are capable of characterizing the nature of the basalt flow sequence including the lithologic structure and the zones of groundwater contribution to the borehole; and provide information for monitoring well screen.

SUMMARY

In summary, WSP and Nu-West seek EPA approval on the following items:

1. Install a total of 8 boreholes along Transect No. 3: A-18 through A-25. Seven of these boreholes (A-18 through A-23, and A-25) will be drilled to 200 feet bgs, and are expected to be converted to monitoring wells. A-24 will be drilled to 130 feet bgs, and may be converted to a monitoring well if the geology at this location will support an open borehole.
2. Forego continuous coring at 5 boreholes in order to complete well installation within the field season of 2011.
3. Set surface casing at 50 feet bgs or when depth to water is encountered, whichever occurs first.

If you have any questions, please do not hesitate to contact me.

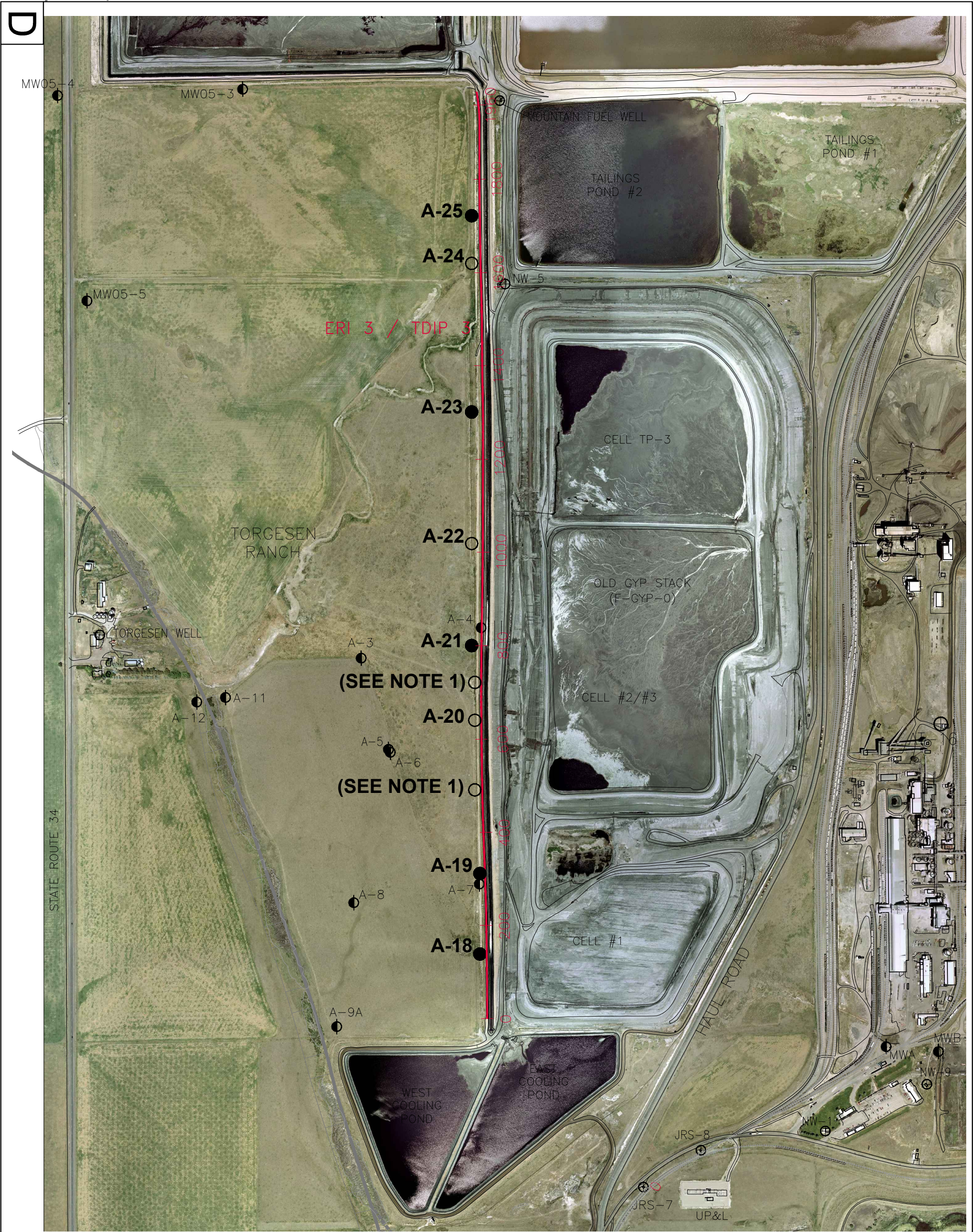
Sincerely,



Amy Hui
Project Manager

cc: Jim Cagle, Nu-West Industries
P. Scott Burton and Bill Taggart, Hunton & Williams
Doug Tanner, IDEQ

Attachments



LEGEND

- COVERED FAULT
- TOPOGRAPHICAL DEPRESSION
- FAULT (WITH ROCK OUTCROP)
- ERI 3 / TDIP 3 TRANSECT
- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- DOMESTIC AND PRODUCTION WELL (APPROXIMATE LOCATION)
- EPA APPROVED BORING LOCATION
- ADDITIONAL BORING LOCATION

NOTE:

1. BOREHOLE A-20 IS PROPOSED TO REPLACE EPA IDENTIFIED BOREHOLE LOCATIONS AT 490 METERS AND 720 METERS.

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REFERENCES: 1. MAP I-557 GEOLOGIC MAP OF THE SODA SPRINGS QUADRANGLE, SOUTHEASTERN IDAHO. USGS, 1969.

SURFACE GEOPHYSICAL SURVEY TRANSECT 3 (ERI/TDIP) WITH PROPOSED CONFIRMATION BORING LOCATIONS
NU-WEST CPO FACILITY
SODA SPRINGS, IDAHO
PREPARED FOR
HUNTON & WILLIAMS

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DATE

REVISIONS

REV	DESCRIPTION	DATE	BY	APP.
1	Revised:	08/16/2011	LS	
2	Revised:	08/16/2011	LS	
3	Revised:	08/16/2011	LS	

WSP
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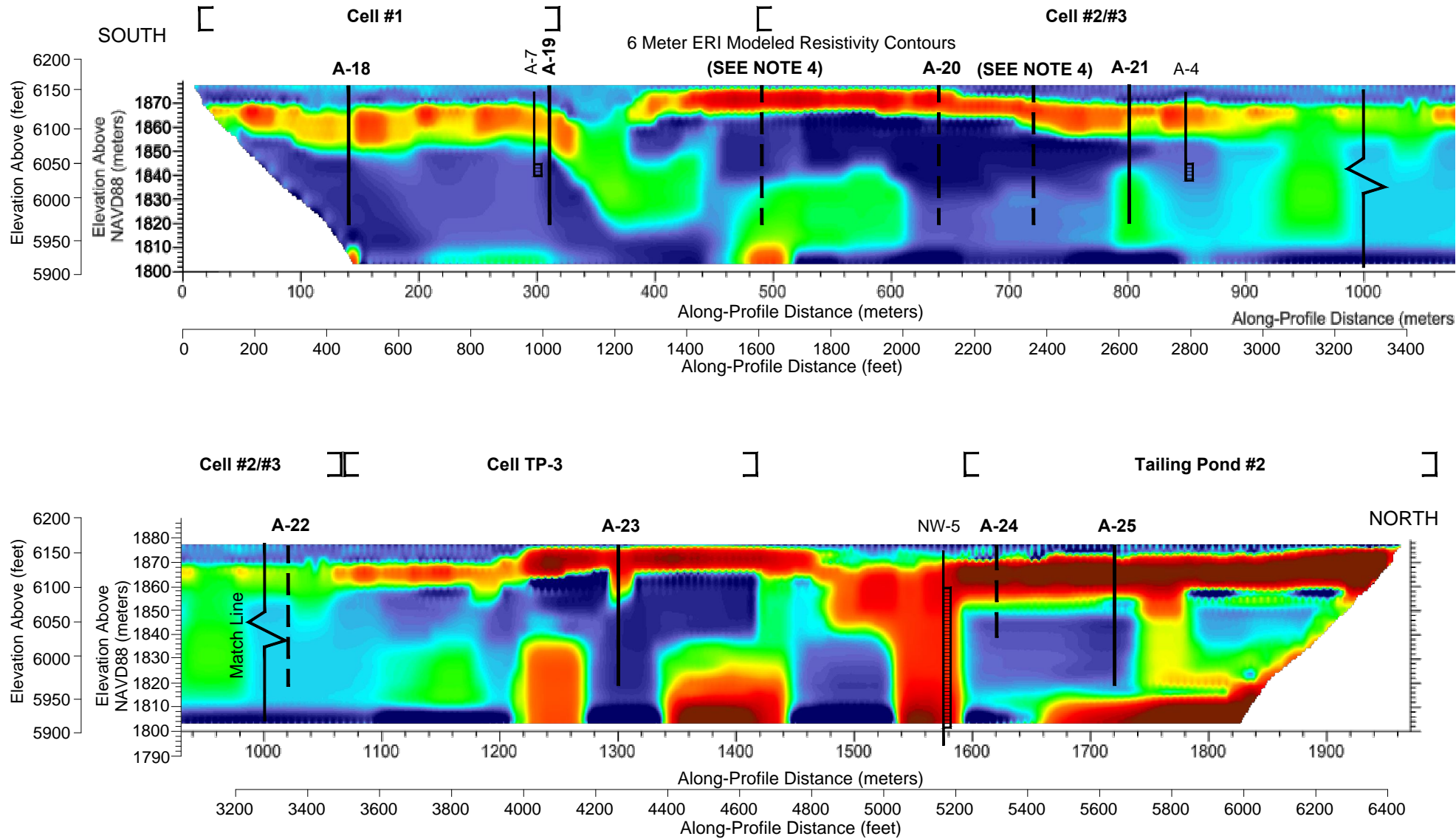
Figure 1
Drawing Number
00023229-011

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B REFERENCE:
ENVIROSCAN, INC.
PROJECT 051147, FIGURE 2



- NOTE:
1. RESISTIVITY PROFILES WERE TAKEN FROM ENVIROSCAN (2011).
 2. WELLS A-4, A-7, AND NW-5 ARE EXISTING WELLS. WELLS A-18 THROUGH A-22 ARE PROPOSED TO BE INSTALLED.
 3. GROUND SURFACE ELEVATION FOR TRANSECT 3 IS 6,163–6,166 ft amsl.
 4. BOREHOLE A-20 IS PROPOSED TO REPLACE EPA IDENTIFIED BOREHOLE LOCATIONS AT 490 METERS AND 720 METERS.

APPROXIMATE HORIZONTAL SCALE: 1"=120'
APPROXIMATE VERTICAL SCALE: 1"=60'

Figure 2

TRANSECT 3 INVERTED RESISTIVITY SECTION
WITH PROPOSED CONFIRMATION
BORING LOCATIONS

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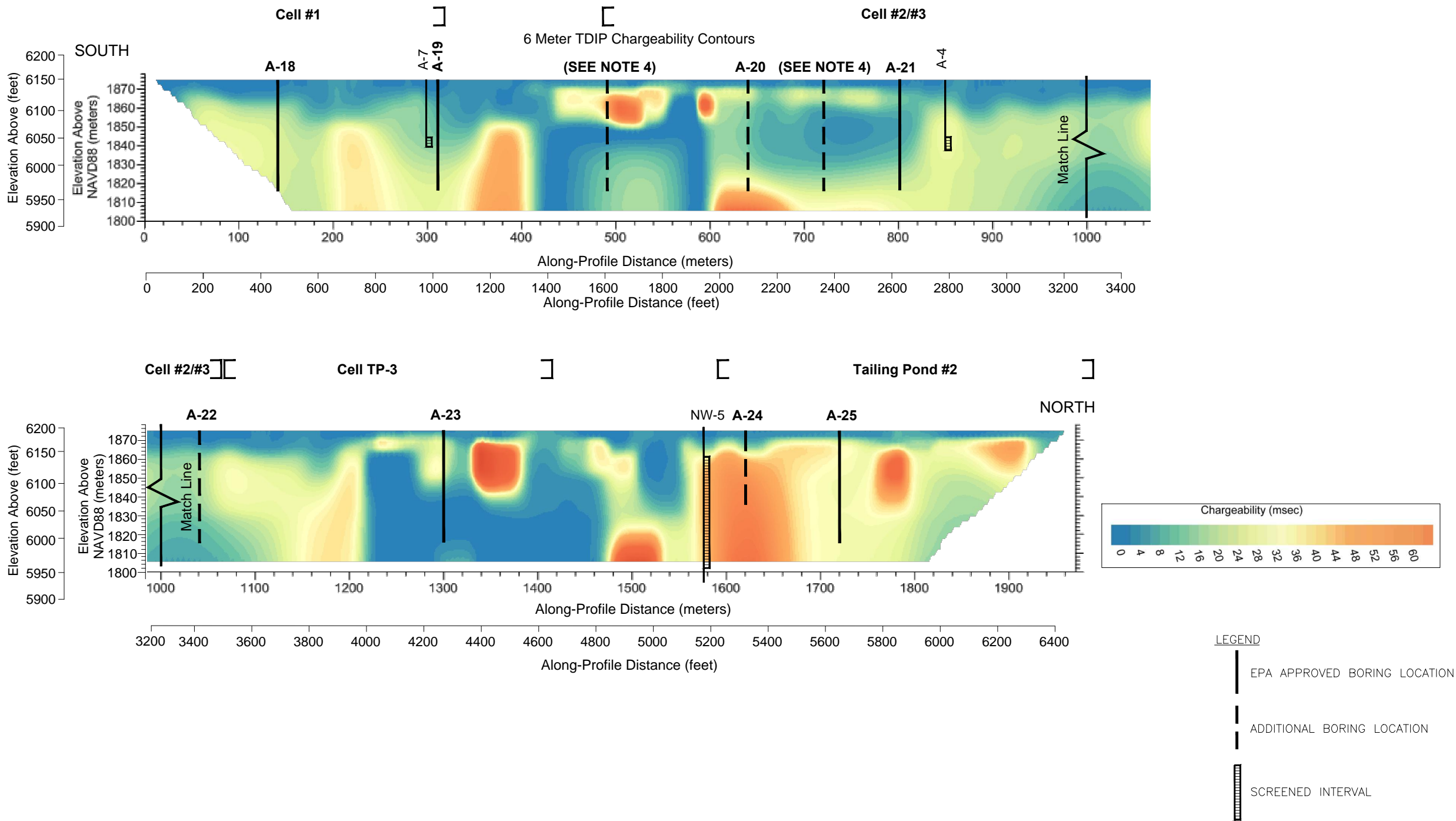
Drawn By: LS 9/12/2011
Checked: 9/12/2011
Approved: 9/12/2011
DWG Name: 00023229-007

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B REFERENCE:
ENVIROSCAN, INC.
PROJECT 051147, FIGURE 2



Drawn By: LS 9/12/2011
Checked: 9/12/2011
Approved: 9/12/2011
DWG Name: 00023229-010

NU-WEST CPO FACILITY
SODA SPRINGS, IDAHO
PREPARED FOR
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Figure 3

TRANSECT 3 INVERTED CHARGEABILITY SECTION
WITH PROPOSED CONFIRMATION
BORING LOCATIONS

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Figure 4 - Schedule for Additional Work Requirements - Monitoring Well Installation in Downgradient Locations
(All durations are shown in calendar days)

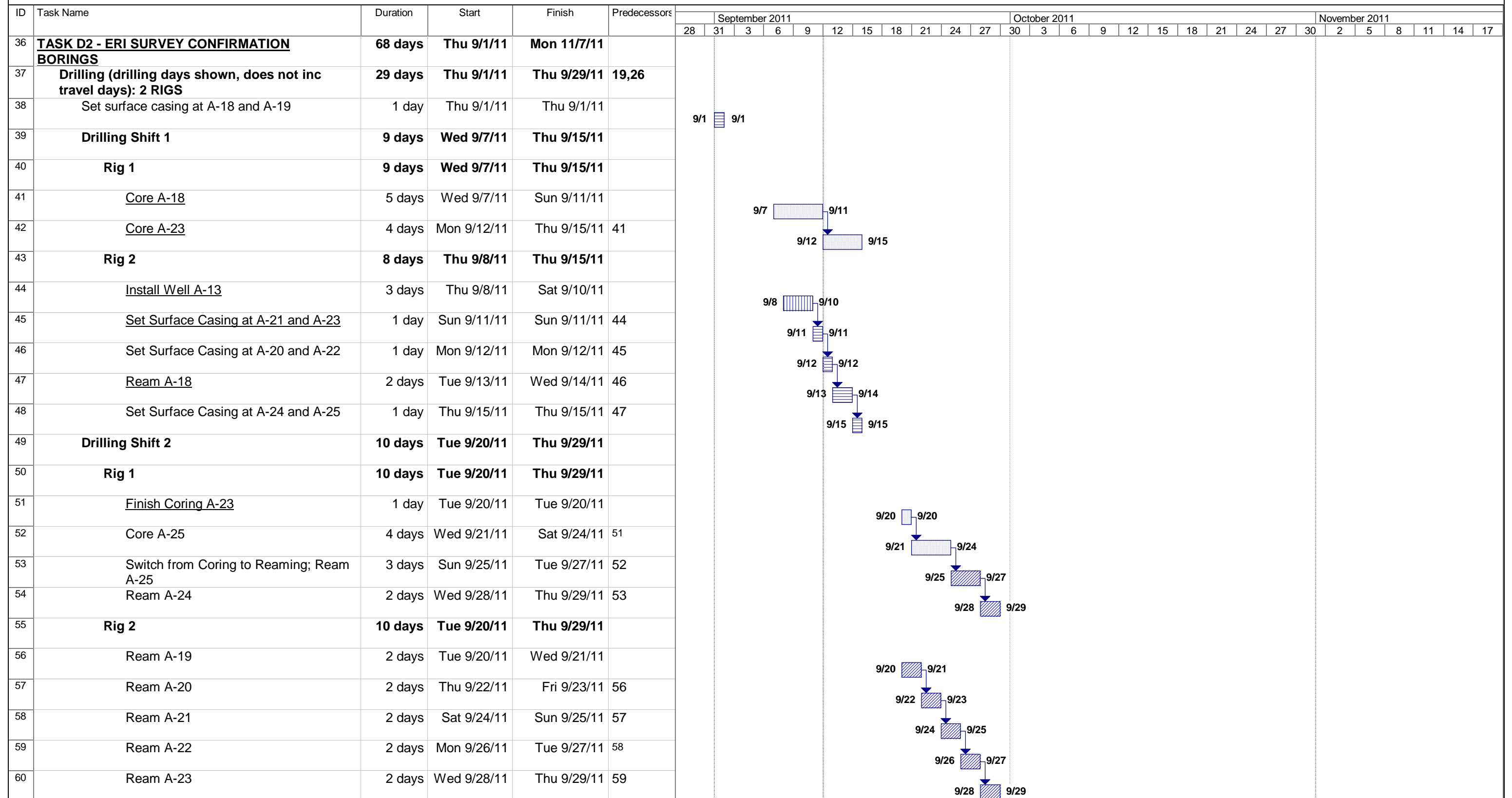


Figure 4 - Schedule for Additional Work Requirements - Monitoring Well Installation in Downgradient Locations
(All durations are shown in calendar days)

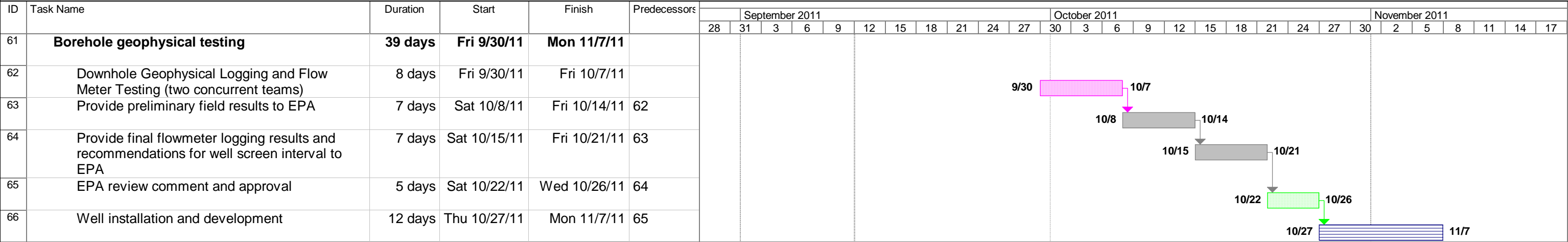


TABLE 1
Summary of Proposed Boring Locations along Transect No. 3

Boring Location (a)	Proposed Depth (ft)	ERI Transect Location (m)	ERI Transect Location (ft)	Apparent Resistivity (in water table)	Electrical Resistivity Imaging Range (in water table)	Chargeability Range (in water table)	Monitored Feature			
							Monitor Cell 1	Monitor Cells 2/3	Monitor Cell TP-3	Monitor Tailings Pond 2
A-18	200	140	459	Low	Low (0 - 24)	Medium (20 - 32)	X			
A-19	200	310	1,017	Low	Low (0 - 48)	Medium (12 - 32)	X			
A-20	200	640	2,099	Low	Low (0 to 96)	Low (8 - 32)		X		
A-21	200	800	2,624	Variable	Medium (0 - 96)	Low (4 - 28)		X		
A-22	200	1,020	3,346	Low	Low (24 - 48)	Low (8 - 28)			X	
A-23	200	1,300	4,264	Low	Low (0 - 96)	Low (4 - 28)			X	
A-24	130	1,620	5,314	Low	Low (0 - 24)	High (48 - 60)				X
A-25	200	1,720	5,642	Low	Low (0 - 48)	Medium (24 - 36)				X

a/ The five borings that have been approved by EPA are shown in **bold** font.

Enclosures

Enclosure A – Rock Core Photographs from A-18



Photograph 1: A-18 Box 01 (15.8 – 24' bgs)



Photograph 2: A-18 Box 02 (24 – 36.1' bgs)



Photograph 3: A-18 Box 03 (36.1 – 45' bgs)



Photograph 4: A-18 Box 04 (45 – 59.8' bgs)



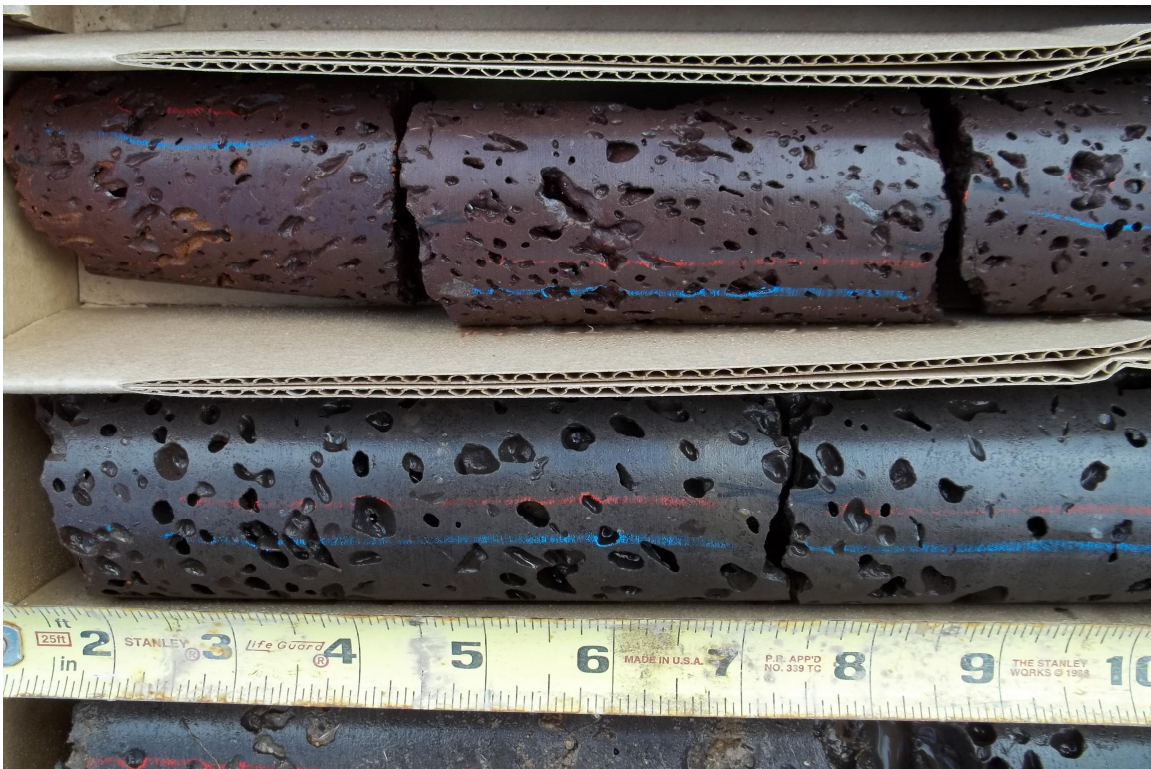
Photograph 5: A-18 Box 05 (59.8 – 63.8' bgs)



Photograph 6: A-18 Box 06 (63.8 – 73' bgs)



Photograph 7: A-18 Box 06 (Fracture Zone)



Photograph 8: A-18 Box 06 (Vesicles)



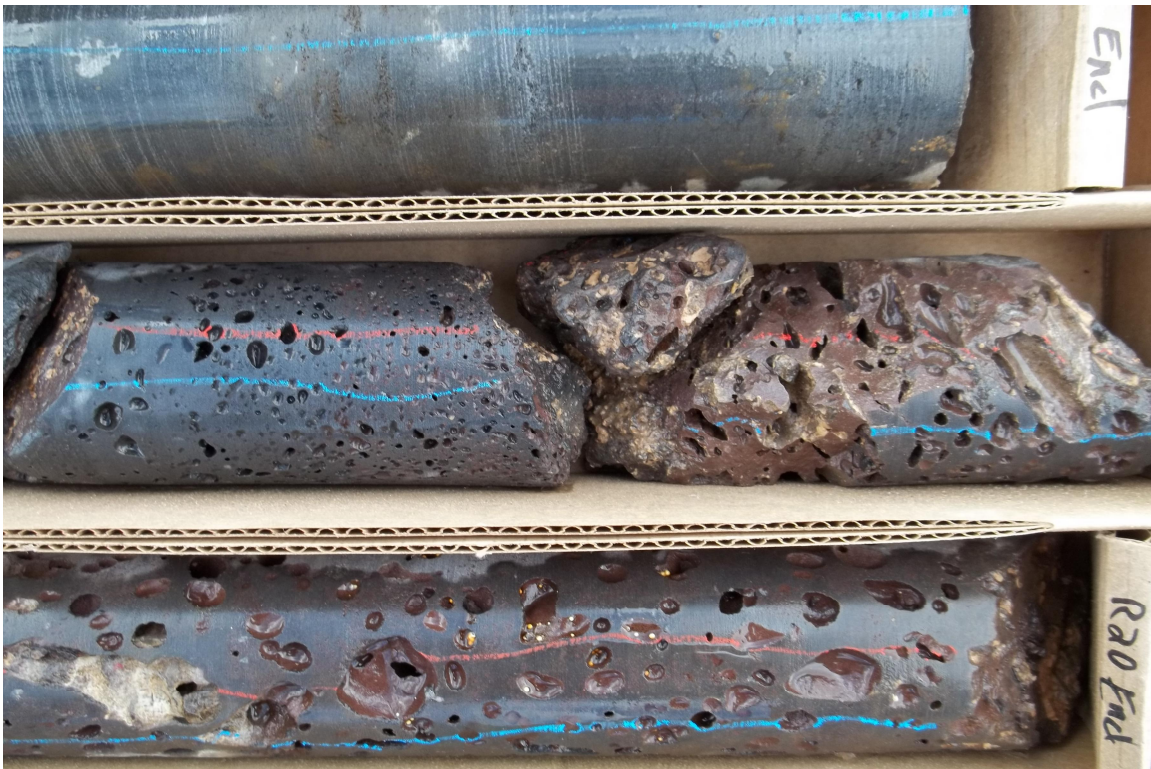
Photograph 9: A-18 Box 07 (73 – 80.5' bgs)



Photograph 10: A-18 Box 07 (Fractures)



Photograph 11: A-18 Box 08 (80.5 – 90.5' bgs)



Photograph 12: A-18 Box 08 (Fractured Flow Boundary)



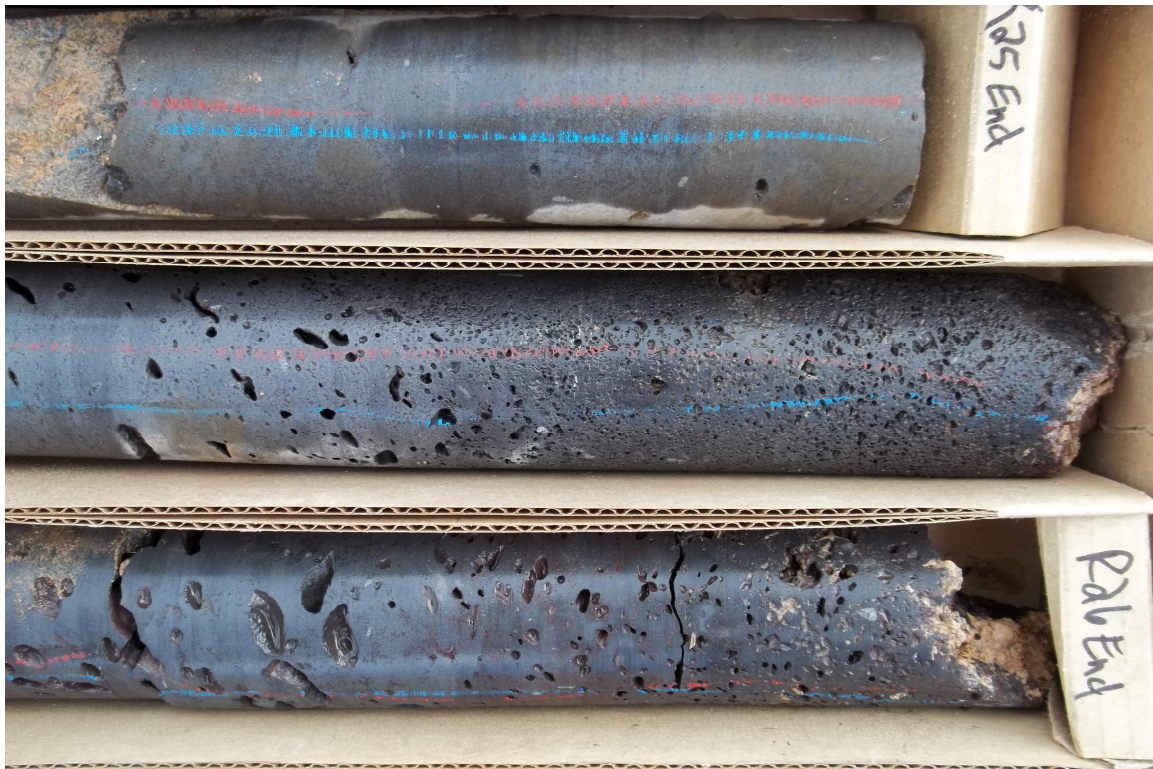
Photograph 13: A-18 Box 09 (90.5 – 105' bgs)



Photograph 14: A-18 Box 09 (Cinders)



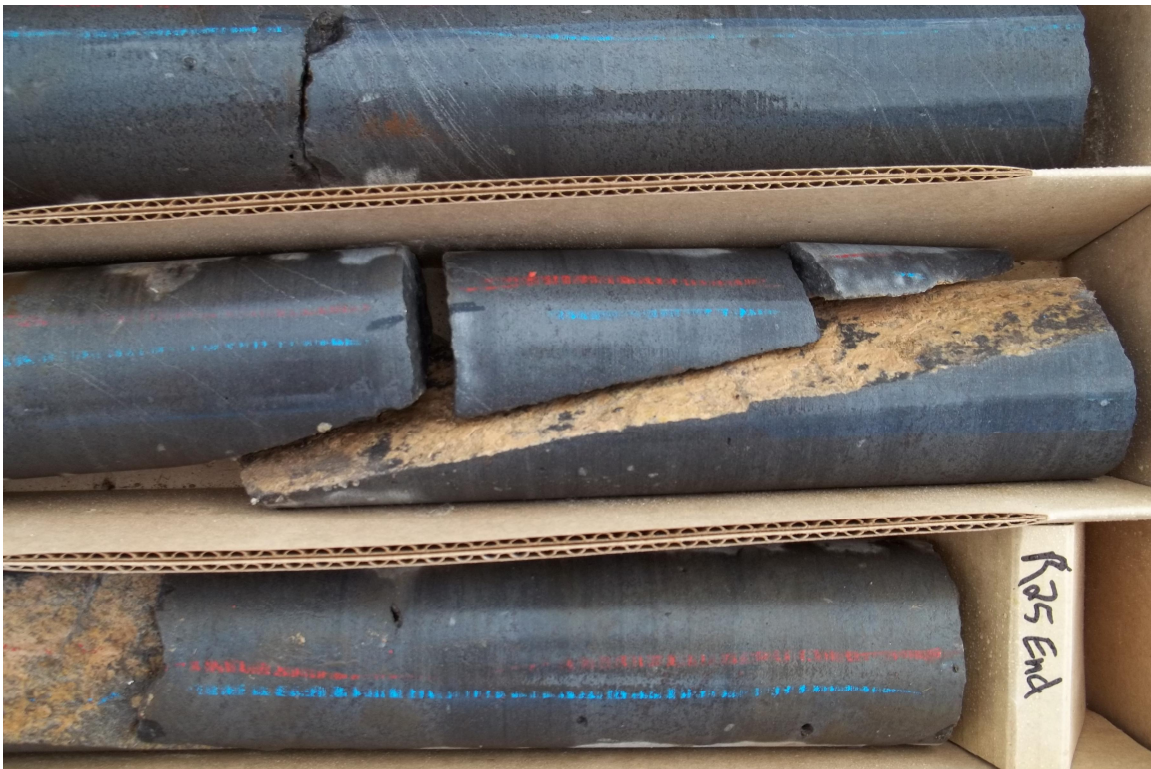
Photograph 15: A-18 Box 10 (105 – 115' bgs)



Photograph 16: A-18 Box 10 (Flow Bottom)



Photograph 17: A-18 Box 10 (Flow Top)



Photograph 18: A-18 Box 10 (Fracture)



Photograph 19: A-18 Box 11 (115 – 125' bgs)



Photograph 20: A-18 Box 11 (Fracture)



Photograph 21: A-18 Box 12 (125 – 145' bgs)



Photograph 22: A-18 Box (Clay Interbed)



Photograph 23: A-18 Box 13 (145 – 156' bgs)



Photograph 24: A-18 Box 14 (156 – 165' bgs)



Photograph 25: A-18 Box 15 (165 – 175' bgs)



Photograph 26: A-18 Box 16 (175 – 184' bgs)

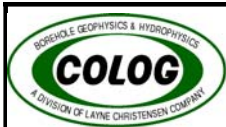


Photograph 27: A-18 Box 17 (184 – 192.5' bgs)



Photograph 28: A-18 Box 18 (192.5 – 200' bgs)

Enclosure B – Draft Geophysical Logging Results from A-18



Optical Televiewer Image Plot

COLOG Main Office
810 Quail Street, Suite E, Lakewood, CO 80215
Phone: (303) 279-0171, Fax: (303) 278-0135
www.colog.com

COMPANY: WSP

PROJECT: Nu-West CPO

DATE LOGGED: 8 Sept. 2011

WELL: A-14

3-Arm Caliper

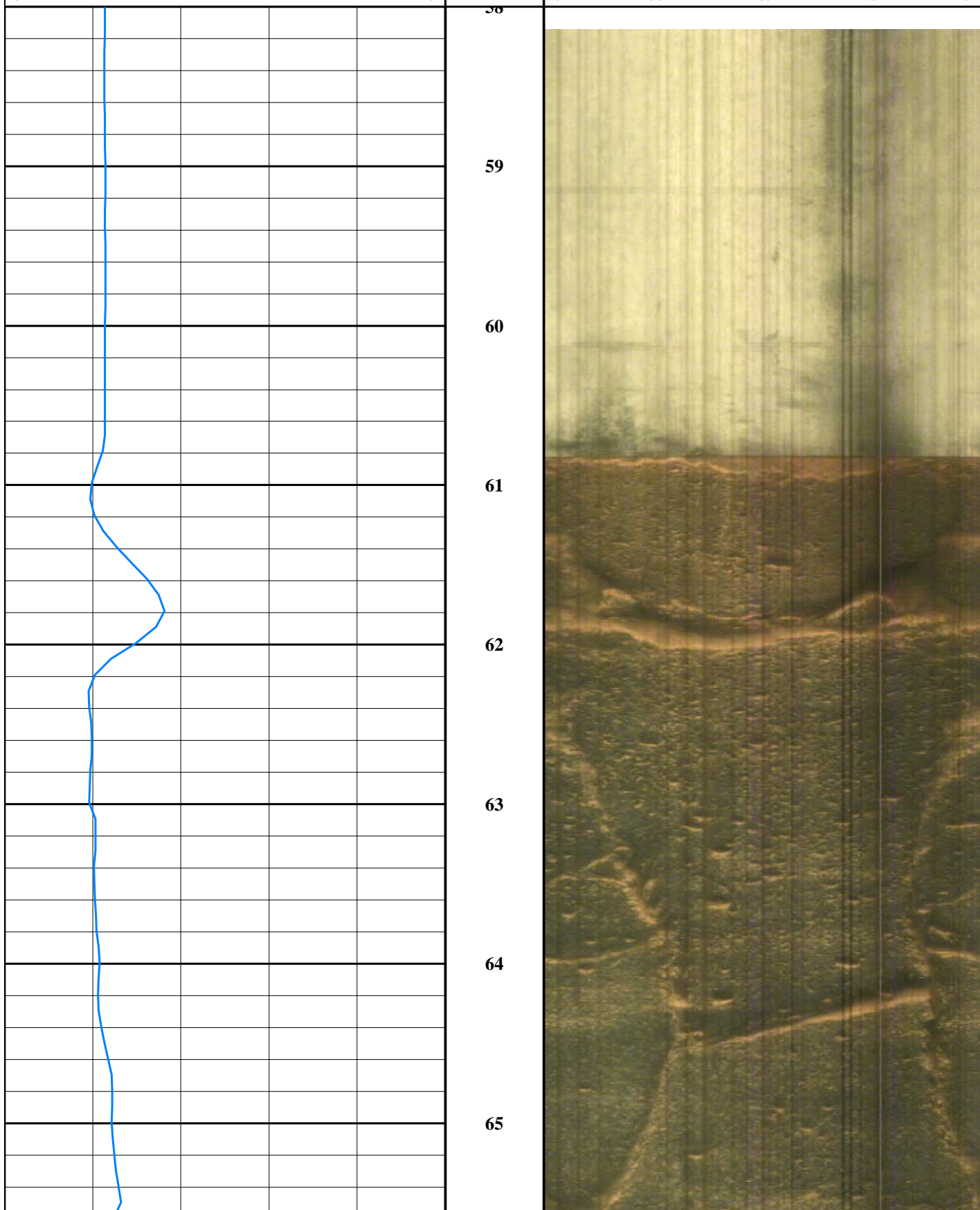
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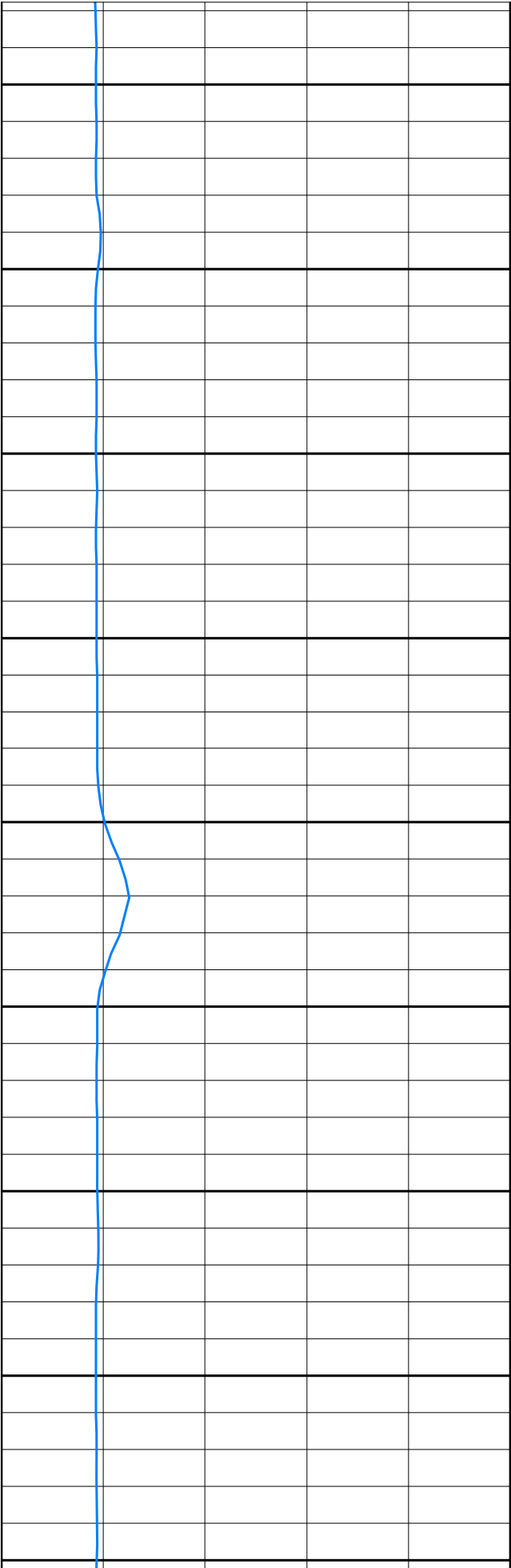
Depth

1ft:10ft

Optical Televiewer Image

0° 90° 180° 270° 0°





117

118

119

120

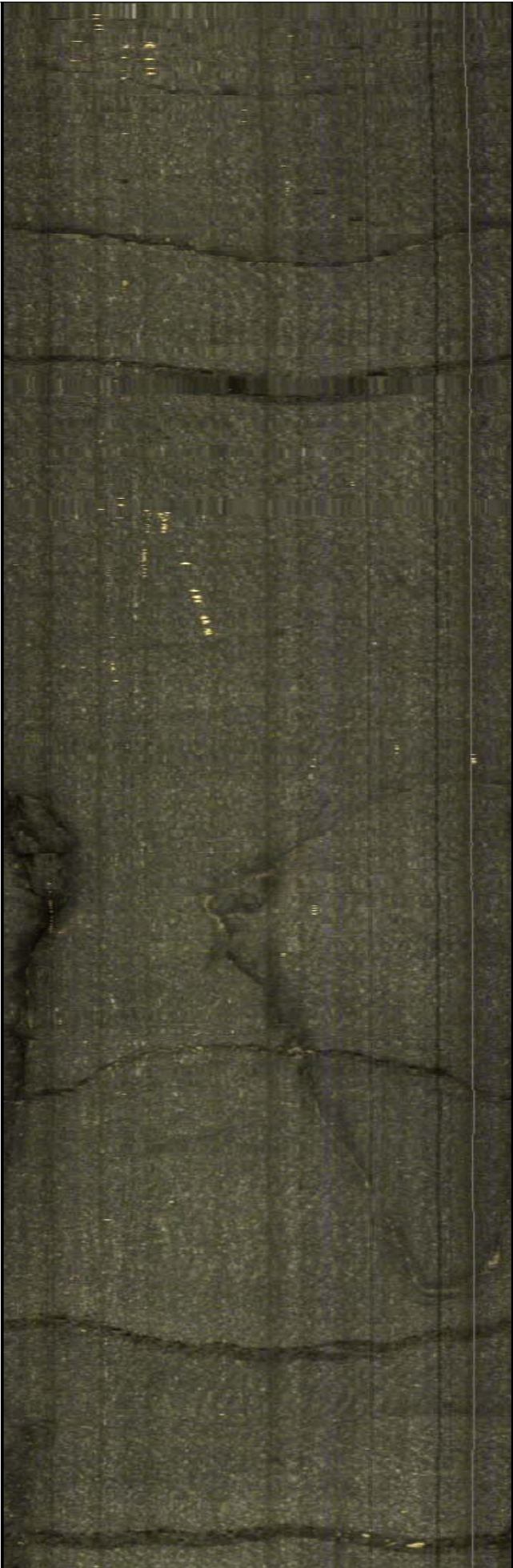
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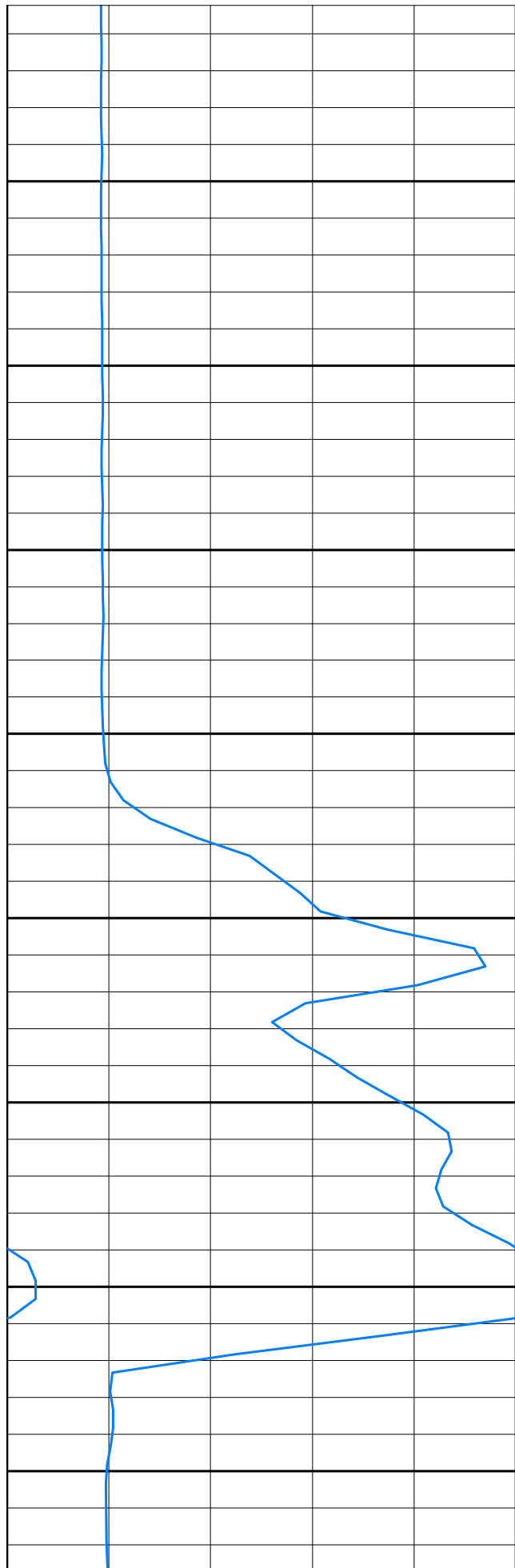
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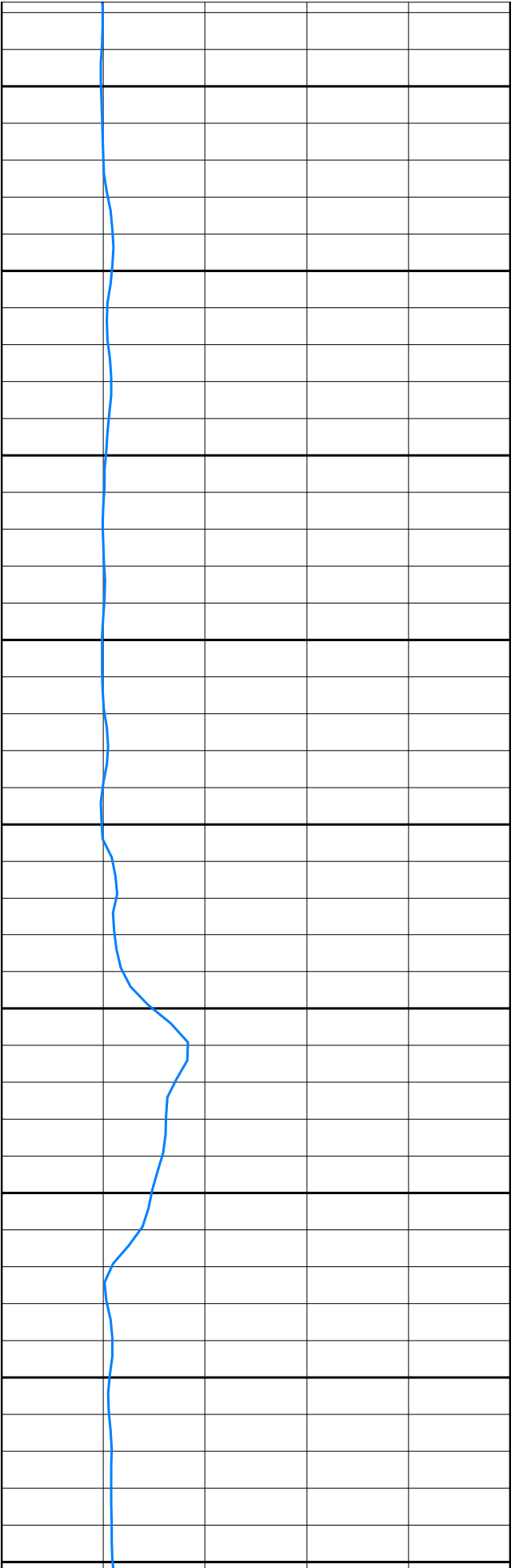
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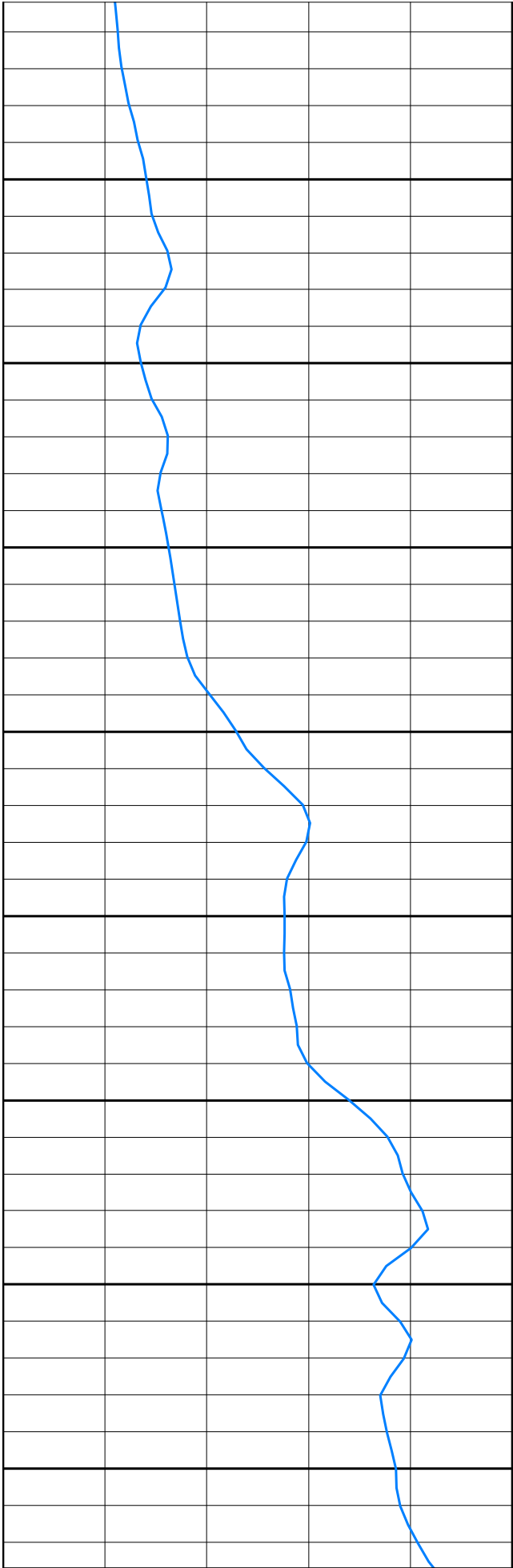
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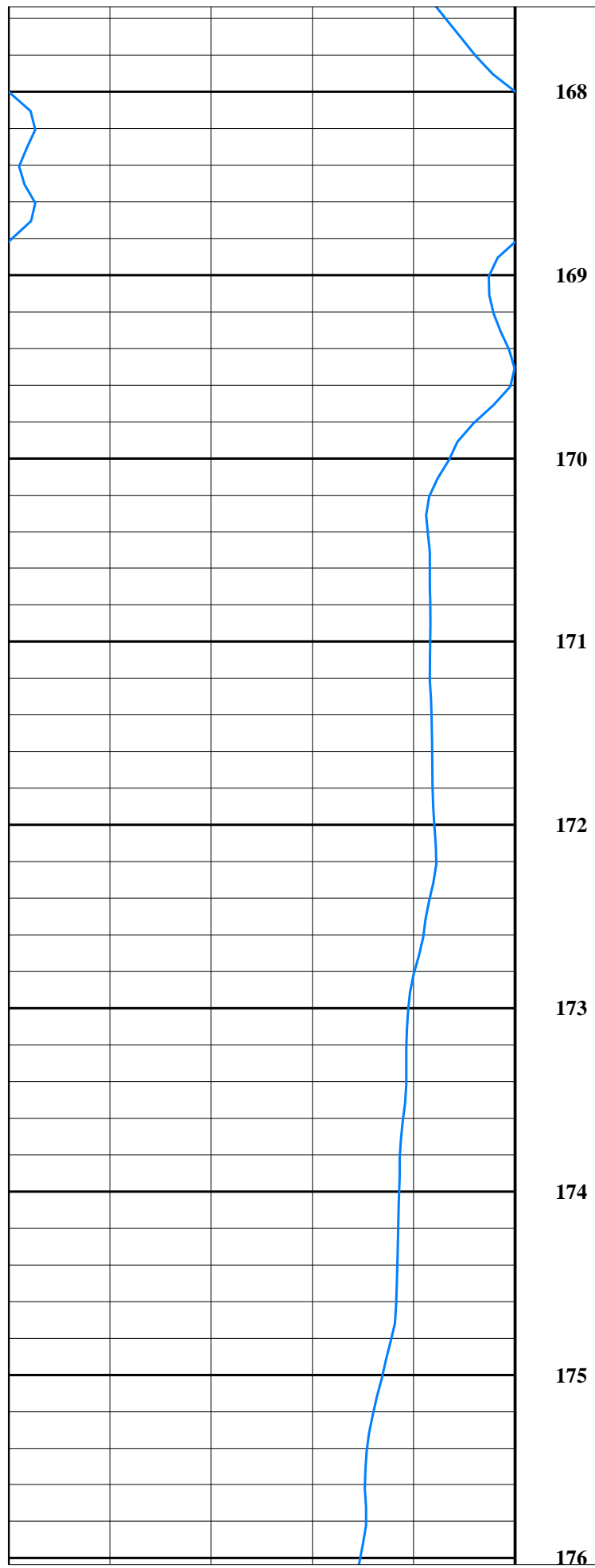
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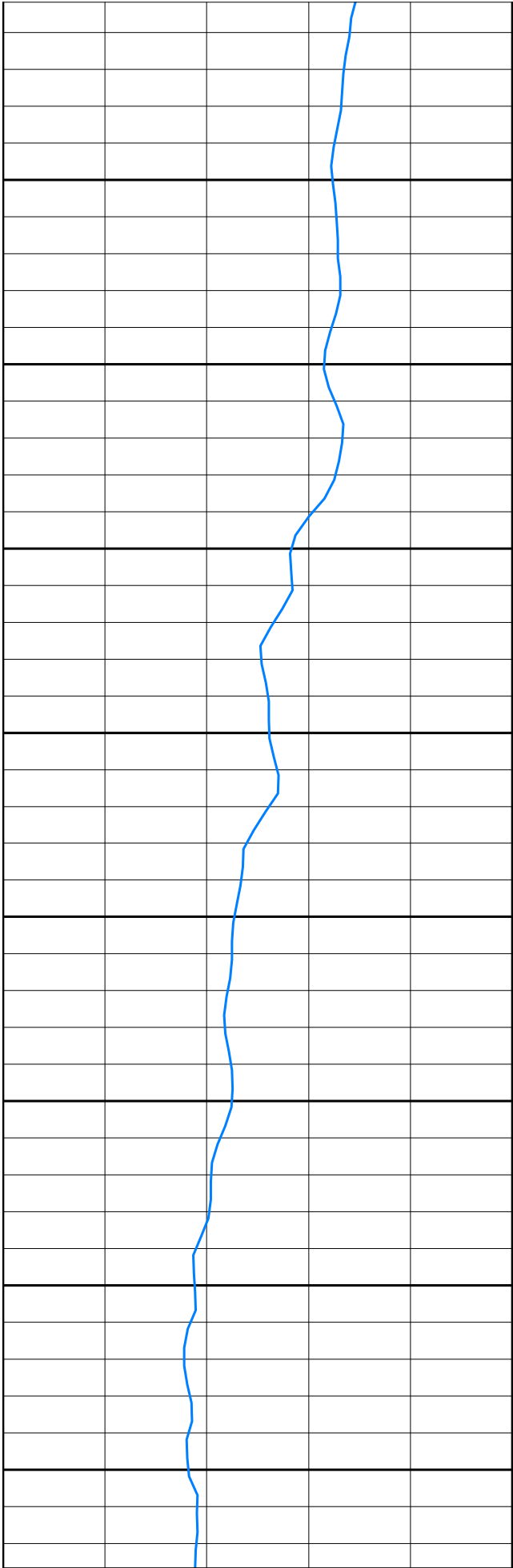
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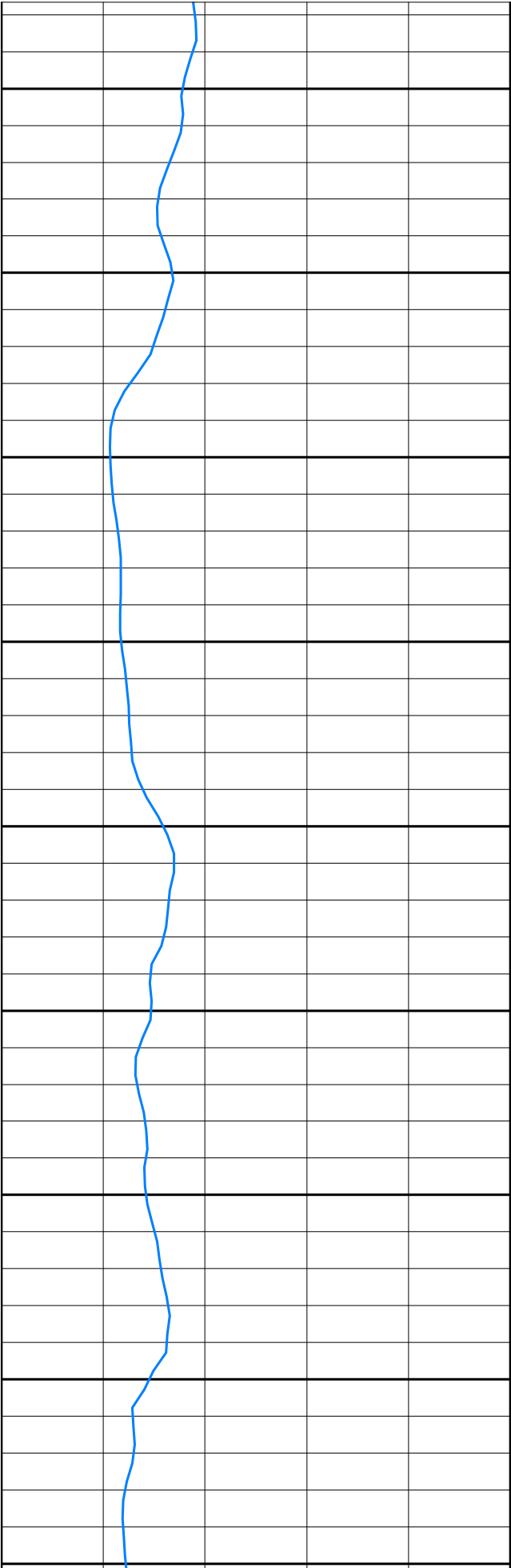
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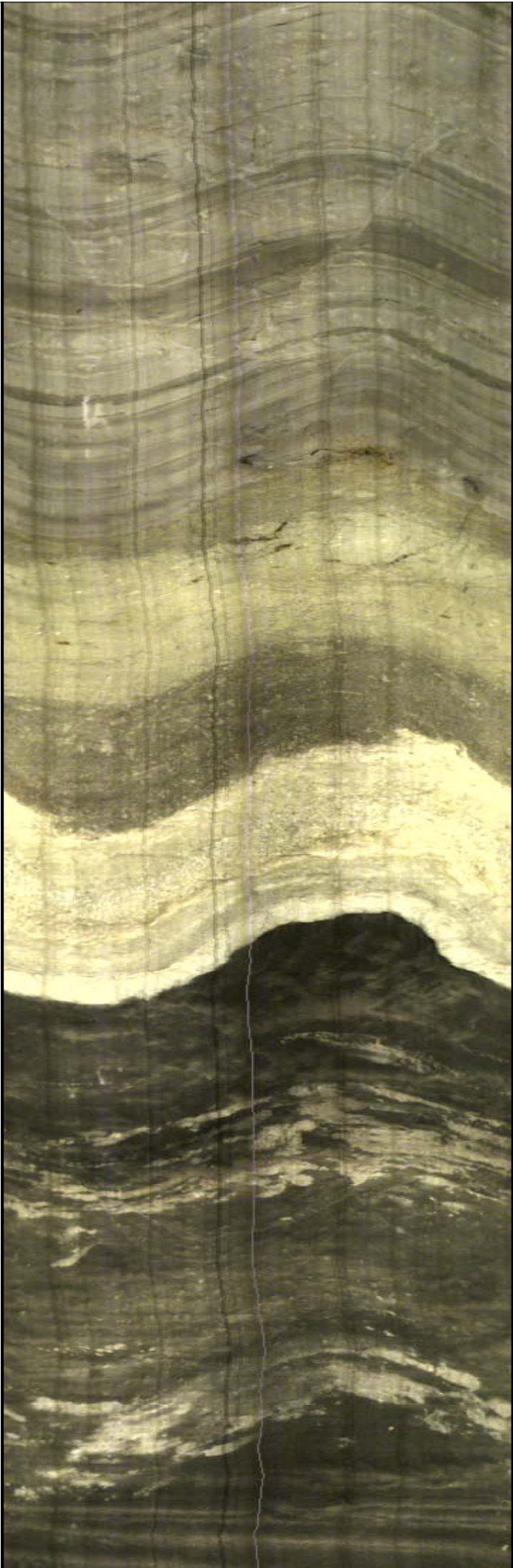
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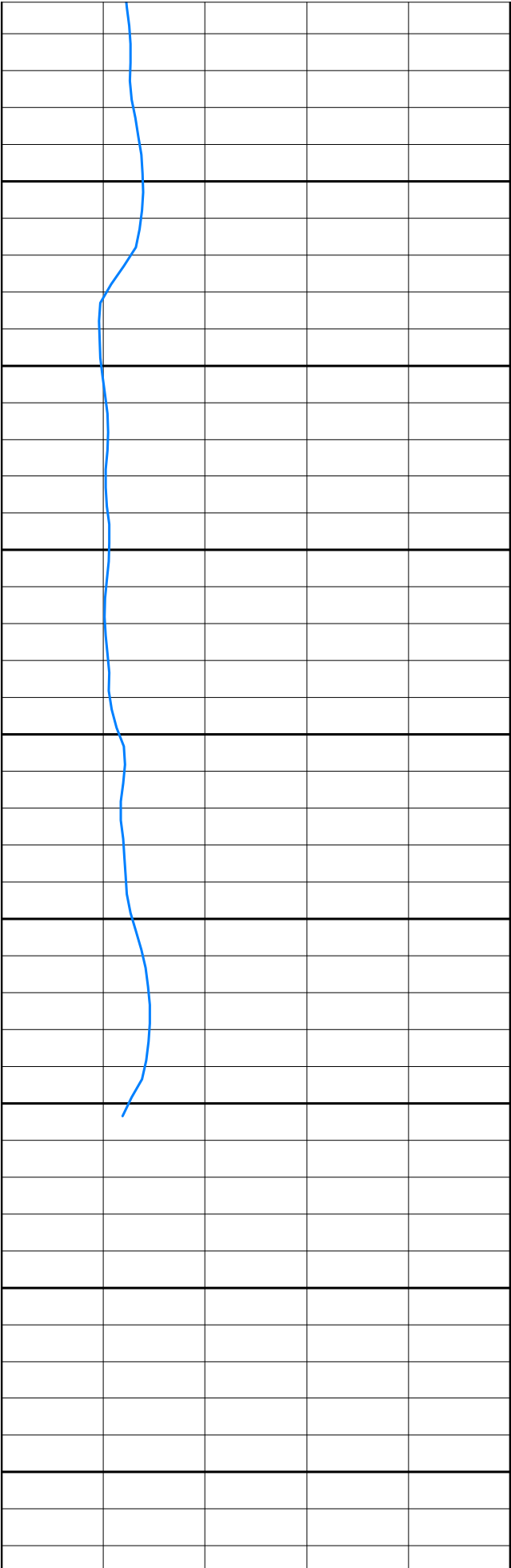
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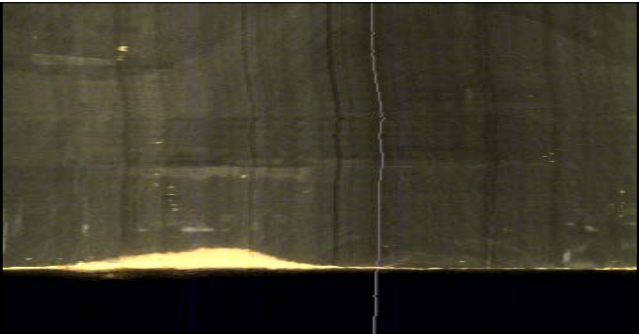
198

199

200

201



					202	
3-Arm Caliper					Depth	Optical Televiewer Image
5		in		10	1ft:10ft	0° 90° 180° 270° 0°



Geophysical/Hydrophysical Summary Plot

COMPANY: WSP

PROJECT: Nu-West

DATE LOGGED: 8, 9 Sept. 2011

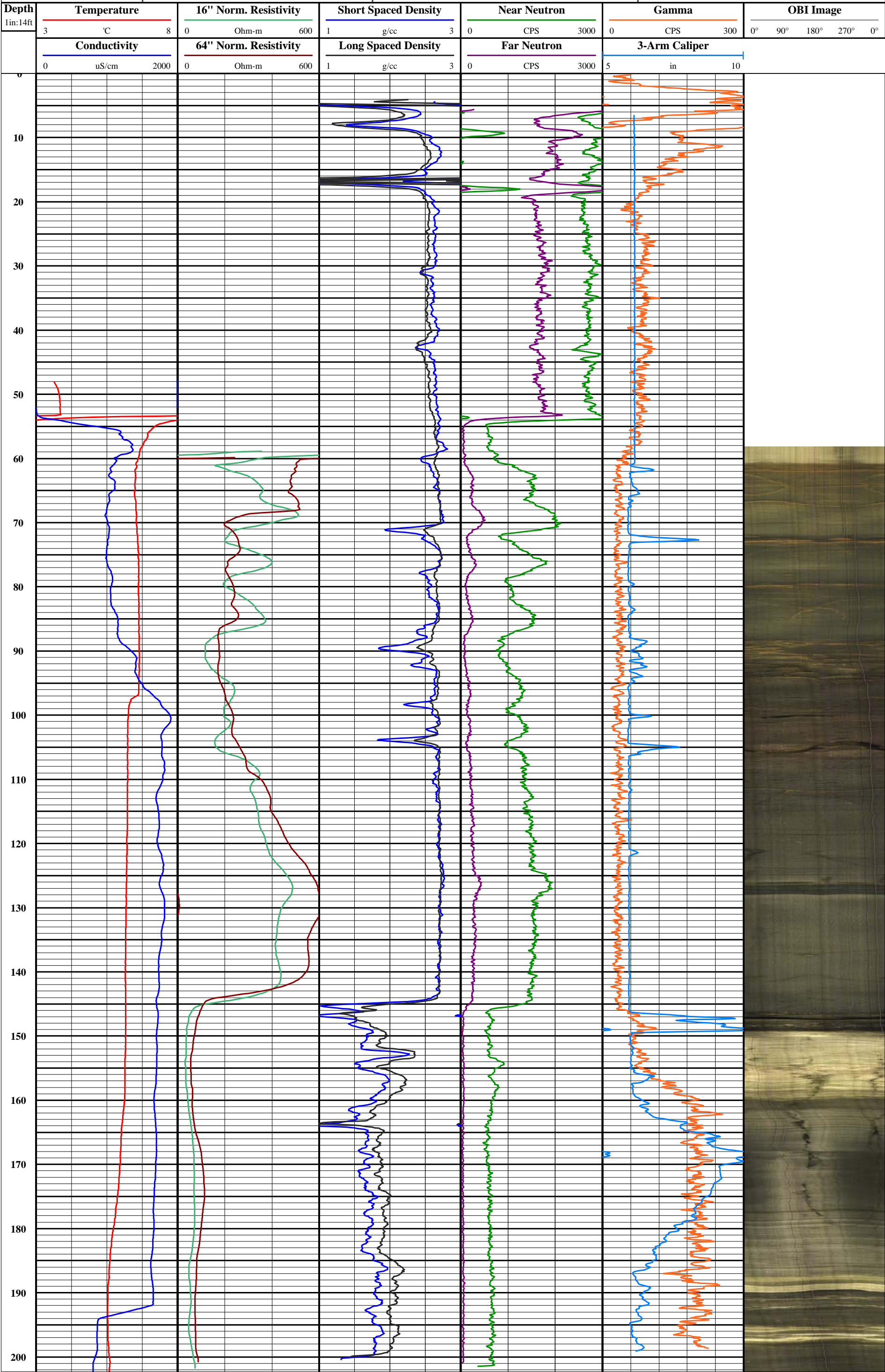
WELL: A-14

COLOG Main Office

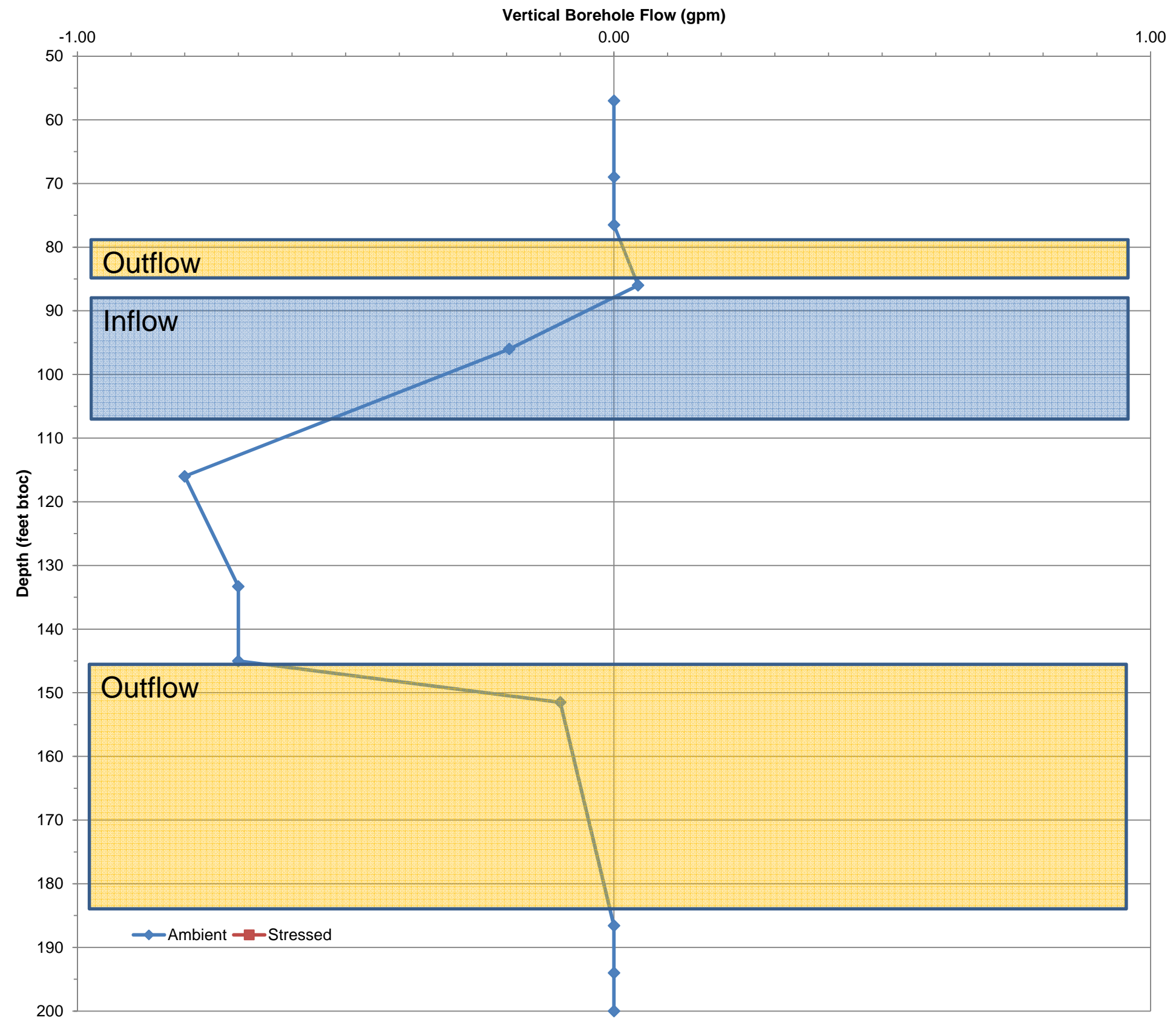
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A-14 Ambient and Stressed Flowmeter Results



3-Arm Caliper (inches)

